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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,075	11/26/2003	Koichiro Tanaka	0756-7223	7829

31780 7590 01/03/2006

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EXAMINER	
ELVE, MARIA ALEXANDRA	
ART UNIT	**PAPER NUMBER**
1725	

DATE MAILED: 01/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,075	TANAKA, KOICHIRO	
	Examiner	Art Unit	
	M. Alexandra Elve	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7,10-16,19-25,28-34,37-43 and 46-52* is/are rejected.

7)☒ Claim(s) *8,9,17,18,26,27,35,36,44,45,53 and 54* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *26 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/3/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 10, 19, 28, 37 & 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (USPN 6,700,096) in view of Yamazaki et al. (USPN 6,242,292).

Yamazaki et al. ('096) discloses the laser annealing of semiconductor materials using a dual or plurality of lasers. The beam spots of the lasers overlap each other on the object to be processed. This enhances crystallinity.

Yamazaki et al. ('096) does not teach the exact order of operations or absorption.

Yamazaki et al. ('292) discloses producing a semiconductor device using laser beams to anneal and crystallize the substrate. Preliminary irradiation is conducted because the absorptance of laser energy is different for single crystal and polycrystalline materials. Thus amorphous silicon is transformed and then the entire substrate is subjected to annealing. Beam spot size is also indicated in the processing. A KrF excimer laser (248 nm) is used. The irradiation is a two stage process and there is overlap of the two laser beams.

It would have been obvious to one of ordinary skill in the art at the time of the invention to note the absorptance of the laser beams, as taught by Yamazaki et al. ('292) in the Yamazaki et al. ('096) system because absorptance measurement ensures a complete crystalline transformation and hence a quality product.

The order of operations in an apparatus is matter of design selection. It is well settled that where patentability is predicated upon a change in a condition of prior art process, the change must be at least critical, that is, it must lead to a new and unexpected result. The applicant has the burden of providing such proof of criticality. Note In re Aller e al. 105 USPQ 223.

Claims 1, 10, 19, 28, 37 & 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. (JP 04-124813) in view of Yamazaki et al. (USPN 6,242,292) or Taketomi et al. (EP 1,049,144 A1).

Ogawa et al. discloses method and apparatus for manufacturing a semiconductor device. The device is irradiated with continuous wave and pulsed lasers. The types of lasers used are Ar+, CO_2, Nd-YAG, and so forth. The wavelength used is 308 nm.

Ogawa et al. does not teach the exact order of operations, absorption or the overlap of laser beams.

Yamazaki et al. ('292) discloses producing a semiconductor device using laser beams to anneal and crystallize the substrate. Preliminary irradiation is conducted because the absorptance of laser energy is different for single crystal and polycrystalline materials. Thus amorphous silicon is transformed and then the entire

substrate is subjected to annealing. Beam spot size is also indicated in the processing. A KrF excimer laser (248 nm) is used. The irradiation is a two stage process and there is overlap of the two laser beams.

It would have been obvious to one of ordinary skill in the art at the time of the invention to note the absorptance or overlap the laser beams, as taught by Yamazaki et al. ('292) in the Ogawa system because absorptance measurement ensures a complete crystalline transformation and hence a quality product, while the overlap of laser beams enhances manufacturing efficiency by decreasing the fabrication time.

The order of operations in an apparatus is matter of design selection. It is well settled that where patentability is predicated upon a change in a condition of prior art process, the change must be at least critical, that is, it must lead to a new and unexpected result. The applicant has the burden of providing such proof of criticality. Note In re Aller e al. 105 USPQ 223.

Taketomi et al. discloses the overlap of beam spots as they are scanned over a substrate. It would have been obvious to one of ordinary skill in the art at the time of the invention to note the absorptance or overlap the laser beams, as taught by Taketomi et al. in the Ogawa system because absorptance measurement ensures a complete crystalline transformation and hence a quality product, while the overlap of laser beams enhances manufacturing efficiency by decreasing the fabrication time.

The order of operations in an apparatus is matter of design selection. It is well settled that where patentability is predicated upon a change in a condition of prior art process, the change must be at least critical, that is, it must lead to a new and

unexpected result. The applicant has the burden of providing such proof of criticality. Note In re Aller e al. 105 USPQ 223.

Claims 2-3, 6-7, 11-12, 15-16, 20-21, 29-30, 33-34, 38-39, 42-43, 47-48 & 51-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. and Yamazaki et al. ('292) as stated in the above paragraph and further in view of Kusumoto et al. (USPN 5,953,597).

Ogawa et al. and Yamazaki et al. ('292) do not teach the use of harmonics or all laser types.

Kusumoto et al. discloses the making of a semiconductor device, using laser irradiation. Various lasers are used, such as KrF excimer laser (wavelength 248 nm), XeCl excimer laser (308 nm), Nd:YAG laser (1064 nm) and a second harmonic component (532 nm) and a third harmonic component (355 nm).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use various lasers and different harmonics, as taught by Kusumoto et al. in the Ogawa et al. and Yamazaki et al. ('292) system because these laser and harmonic types yield tailored irradiation on the semiconductor substrate.

Claims 4-5, 13-14, 22-25, 31-32, 40-41 & 49-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogawa et al. and Yamazaki et al. ('292) as stated in the above paragraph and further in view of Yamazaki et al. (USPN 6,156,997).

Ogawa et al. and Yamazaki et al. ('292) indicate beam spot size in the processing, but do not specifically teach shapes.

Yamazaki et al. ('997) discloses the formation of a semiconductor device, whereby laser beams are overlapped. Beam spots may be square or rectangular.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use different beam spot shapes, as taught by Yamazaki et al. ('997) in the Ogawa et al. and Yamazaki et al. ('292) system because the beam spot type can yield a tailored irradiation on the semiconductor substrate.

Allowable Subject Matter

Claims 8-9, 17-18, 26-27, 35-36, 44-45 & 53-54 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the claims as supported by the specification differs from the prior art in that it does not teach the incident angle inequality whereby the angle is greater than or equal to (W1/2d); W1 being the length of the major or minor axis of the beam spot and d being the thickness of the substrate.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

December 27, 2005.

M. Alexandra Elve
Primary Examiner 1725